

Empirical Modelling for ENA Investigations

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The empirical approach in global modelling the proton distributions of the inner magnetosphere [1] is here applied for storm time analysis. This method based on comparison of the Milillo et al. [2] model with local proton spectra, results as a simple and powerful tool for inner magnetospheric studies. The global evolving proton distributions are modelled and ENA simulations at specific vantage points are obtained. The presented simulations are compared to the ENA images collected by IMAGE/HENA and LENA. The model parameters could be tuned in order to obtain a better agreement with the observations. In this way a deconvolution method of the ENA images could be obtained. Finally, the macroscopic physical features and their developments on a global scale are analysed in terms of magnetic pressure, electric potential, equatorial current and total energy. The model parameters and the derived quantities (related to the ring current) are compared to the geomagnetic indexes as well as to the solar wind data.

References

- [1] S. Orsini, A. Milillo, A. Mura, Modelling of the Inner Magnetospheric Time-Evolving Plasma: an empirical approach based on proton distribution, *Journal of Geoph. Res.*, **109**, A11216, doi: 10.1029/2004JA010532 (2004).
- [2] A. Milillo, S. Orsini, I.A. Daglis, Empirical model of proton fluxes in the equatorial inner magnetosphere. 1. Development, *Journal of Geoph. Res.*, **106**, 25713-25730 (2001).